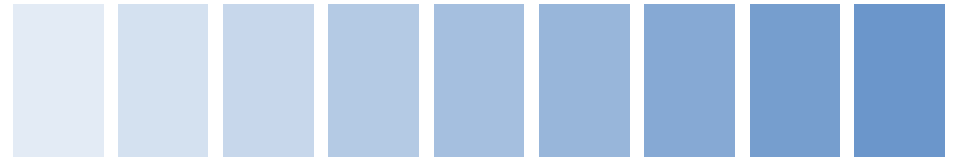




Sensys Networks

Sensys Travel Time
A Solution for Congestion
Management



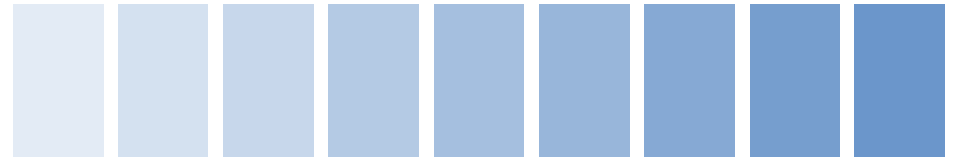
Who Is Sensys Networks?

- **Leading provider of wireless traffic detection and integrated data systems for freeways, arterials and traffic control.**
- **Initial research of concept at UC Berkeley**
 - funded by Caltrans (2000-2003)
 - Private sector took over idea in 2003 with Venture Capital
- **In production since 2005**
- **5 Fundamental patents awarded and 3 Patents Pending**
- **Accelerating pace of deployments**
 - 80+ customers in 30 US States and 15 countries internationally
- **Fastest growing traffic detection system provider ever**

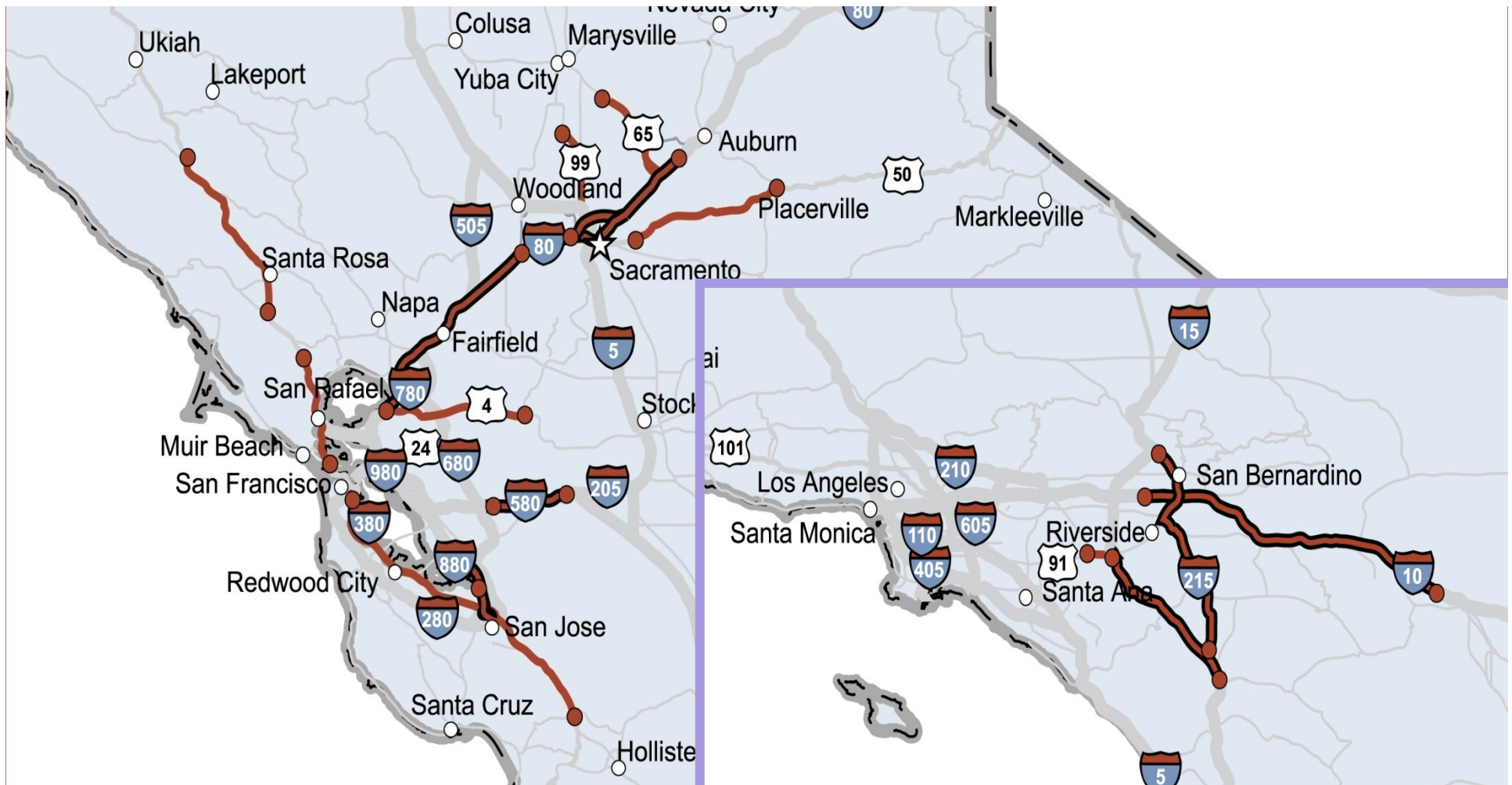


Sensys Customers: 30 U.S. States (& 15 Countries)





Caltrans SHOPP/CMIA Deployments in 08-09



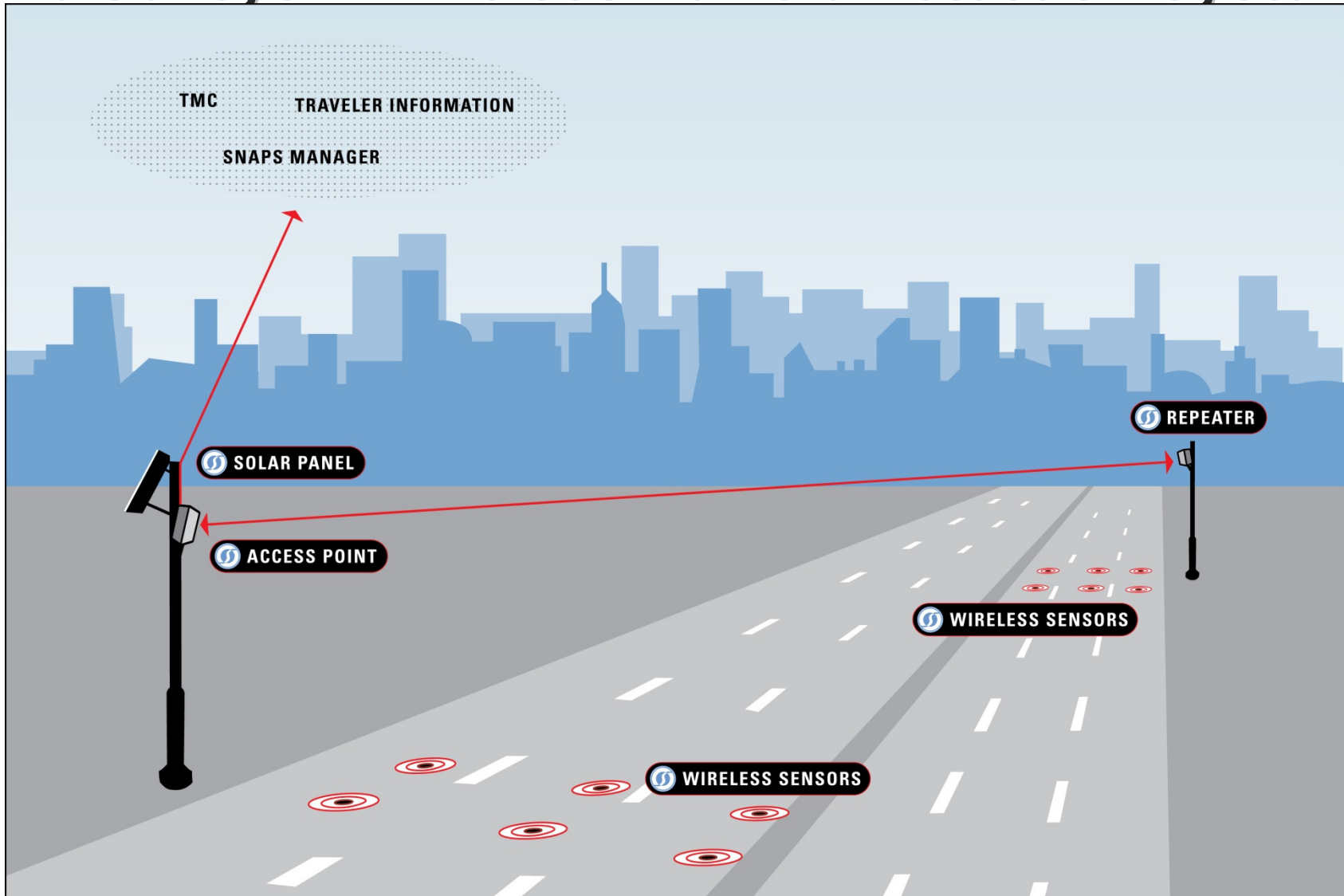


Why Sensys Networks?

- **Sensys Wireless Detection systems are now becoming top choice of technology for the some world's largest implementers of vehicle detection and traffic data systems because they are:**
 - **ACCURATE**
 - **FLEXIBLE**
 - **AFFORDABLE**
 - **RELIABLE**
 - **RE-USABLE**
 - **FUTURE PROOF**



The Sensys™ Wireless Vehicle Detection System





Sensys Components





Unique and Innovation Solution

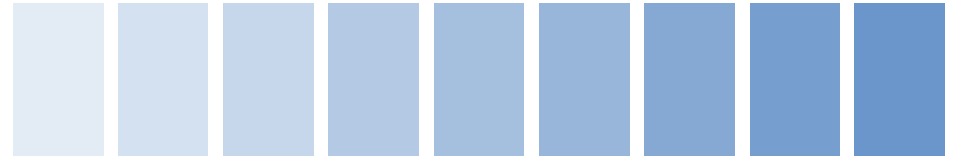
WVDS provides agencies with a solution that provides:

- 1) Accurate vehicle data in managing traffic flows
- 2) Cost and time savings in installation and setup
- 3) Reduced traffic congestion and improved air quality in metropolitan areas
- 4) Provides a single platform for local streets, arterial, ramps and freeways for integrated traffic data systems for corridor management
- 5) Arterial travel time using a unique Vehicle Re-Id method



Sensys Travel Time

- **What is it?**
 - A patented, accurate and reliable system that measures and reports REAL-TIME travel times along a city traffic corridor
 - It improves corridor management and reduces congestion
 - Enables drivers to choose best route and balance capacity/route usage
 - Allows agencies to coordinate and make better use of capacity
 - Decreases the amount of time vehicles are on the road
 - Reduces fuel consumption and vehicle pollution
 - An infrastructure based solution:
 - Uses unique vehicle magnetic signatures with no privacy issues
 - Re-identifies vehicles to provide accurate travel times and vehicle density
- **Who benefits from this technology solution?**
 - Drivers, emergency services, local and state DOTs



Travel Time Benefits

- **What does it provide?**
 - Travel Time per vehicle
 - Travel Time distribution
 - Queue length or density measurements
 - Plus a host of other parameters to evaluate the performance of the arterial or a particular traffic signals
- **Scalable system**
 - Start with a few key arteries in the city and expand out over time to increase responsiveness and coverage
- **Enables the 4th Dimension in traffic management**



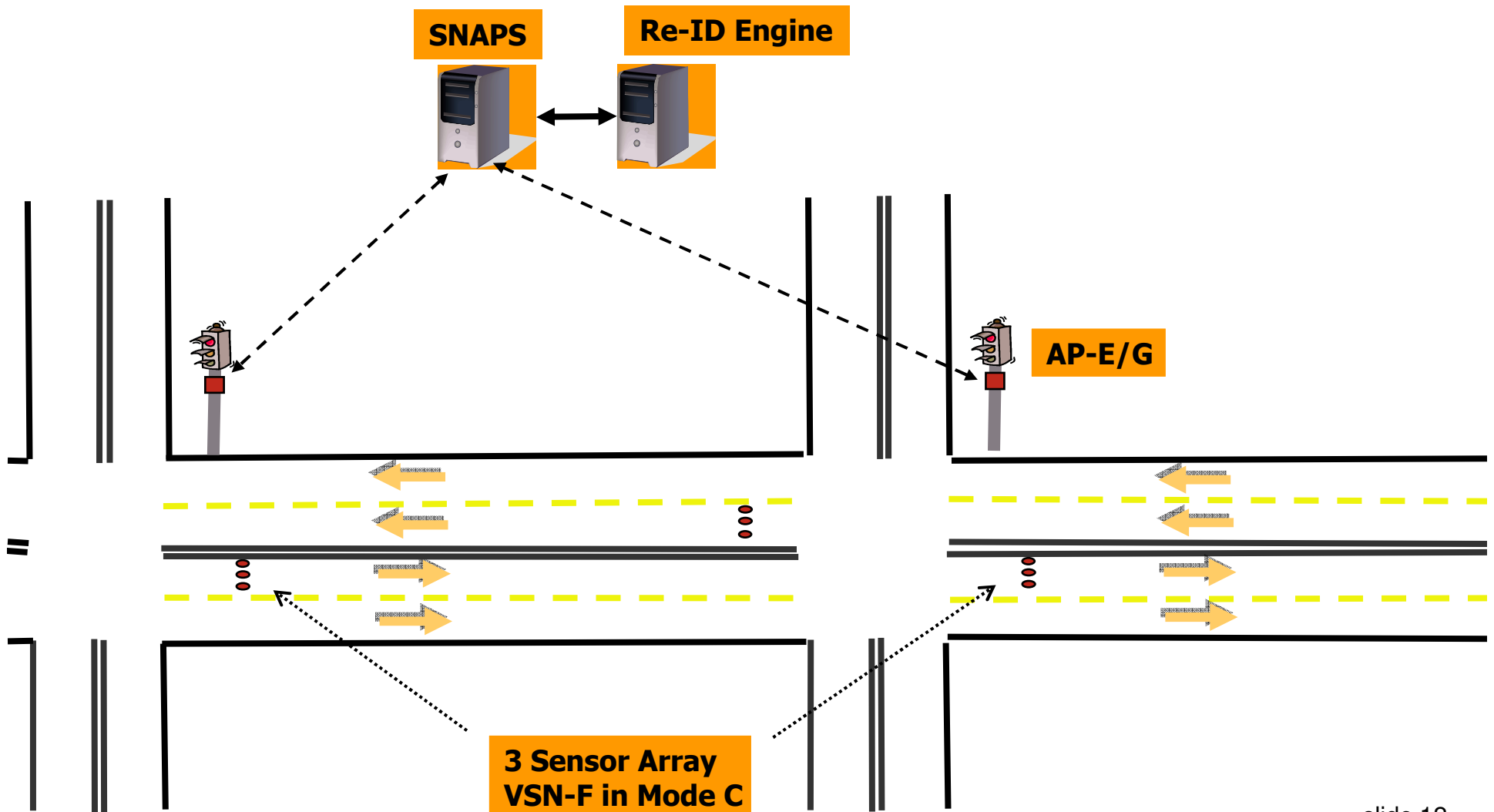
4th Dimension in Traffic Management

- **Until now, arterial traffic management has been based on 3 fundamental measured parameters:**
 - Counts (Volume)
 - Speed
 - Occupancy (Density)
- **We are adding a 4th and highly desirable new parameter**
 - Arterial travel time (Delay)

**Arterial Travel Time is considered, by many,
to be the Holy Grail
of Urban Traffic Management**



Sensys Travel Time System Components





Travel Time Technology

- What's the technology behind the solution?
 - Matching unique vehicle signatures from the sensors
 - The sensors provide the magnetic signature of a vehicle and the time it crosses the sensor
 - The signature is independent of vehicle speed allowing matching to occur in stop and go traffic conditions
 - A new application running on field proven, mature Sensys VDS240 wireless vehicle detection system

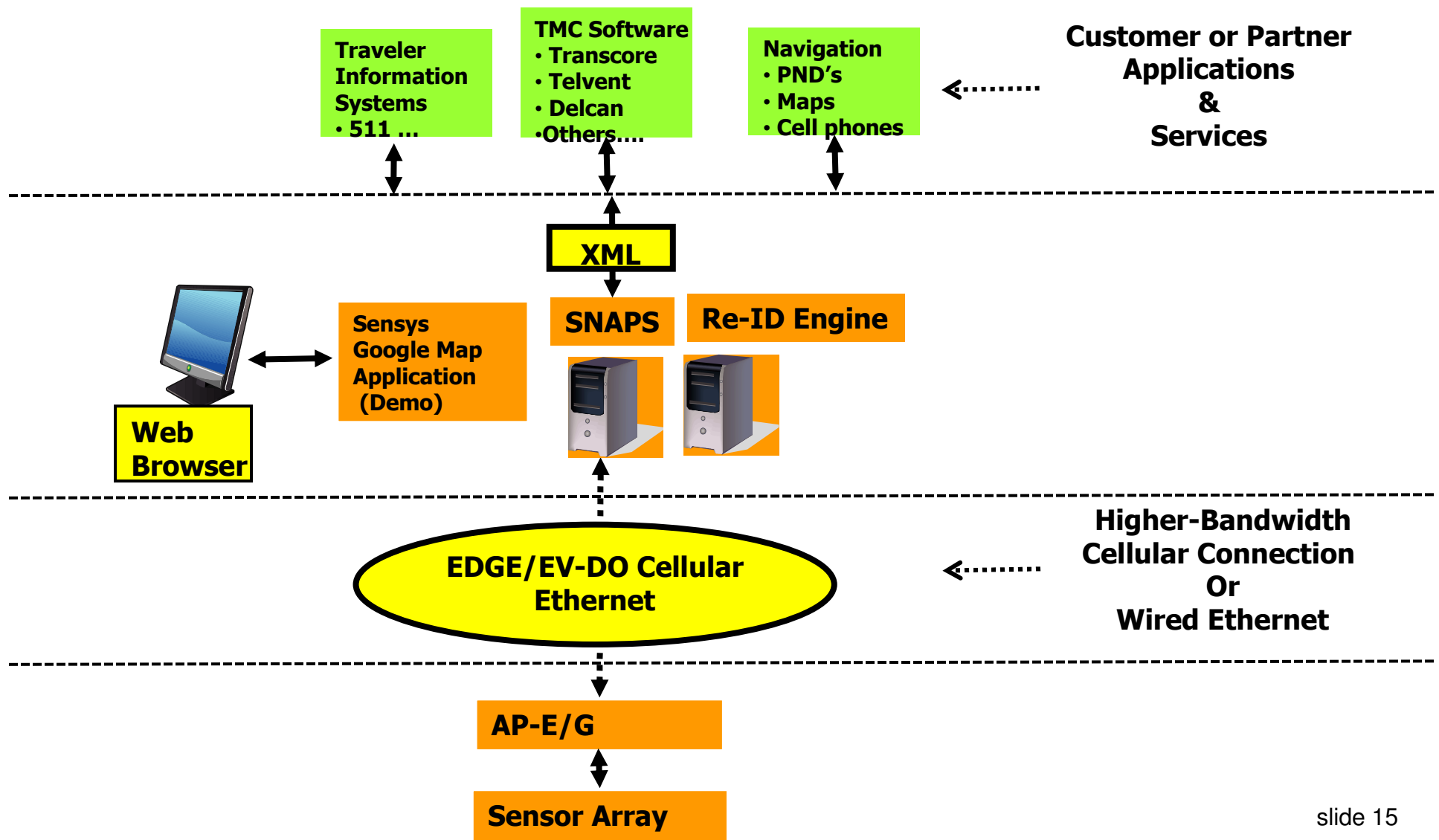


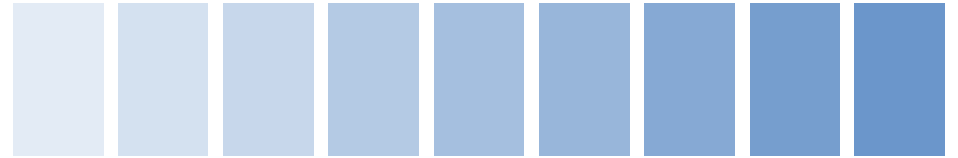
Travel Time Trade-offs / Decisions

- **# of Lanes**
 - Implement in Fast Lane = Basic system
 - Additional lanes improves accuracy and provides redundancy and incident detection
- **Density of sensors (sensors /lane)**
 - 3 for typical lanes
 - 5 for wider lanes
- **Distance between sensor arrays**
 - 1/2 mile if there is no major leakage – i.e. large percentage of vehicles leaving or joining the arterial
 - Major cross traffic areas must be instrumented

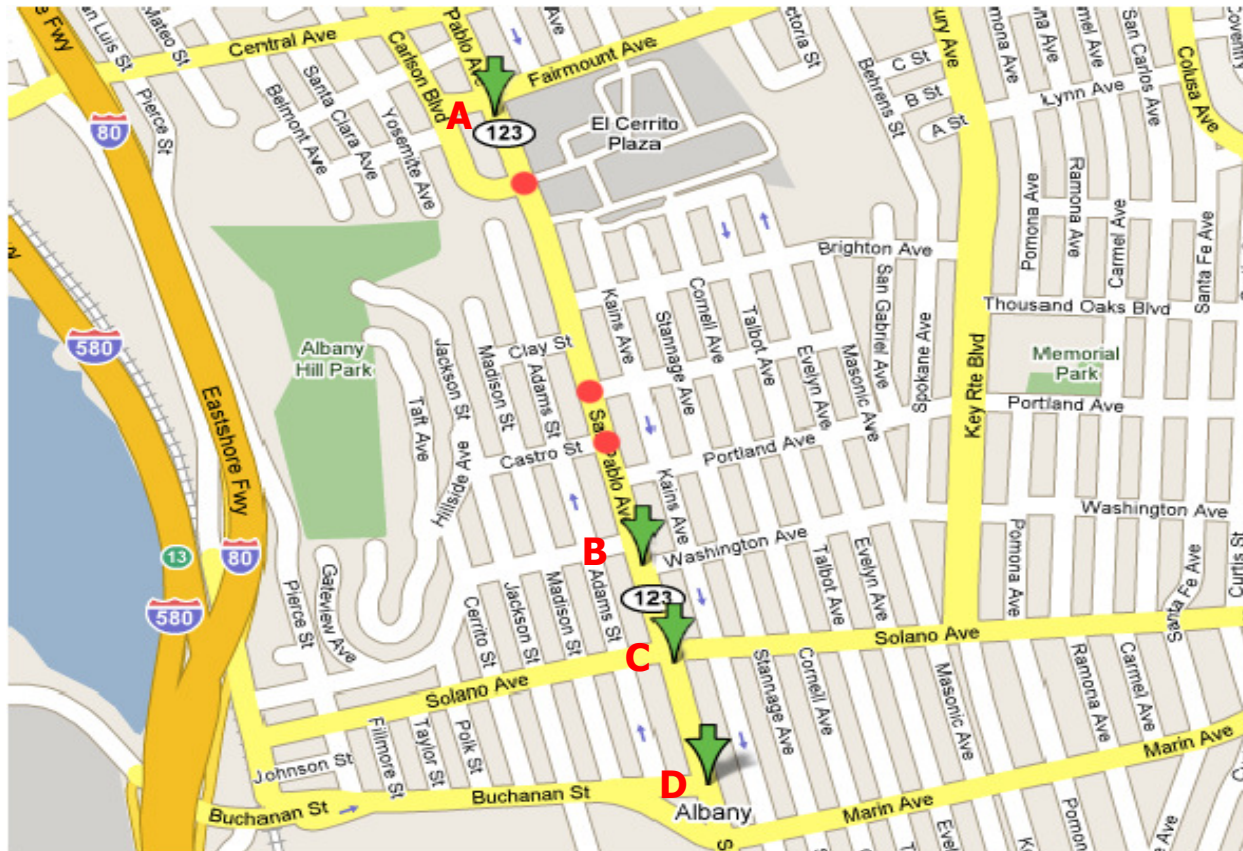


Sensys Travel Time Architecture & Interfaces





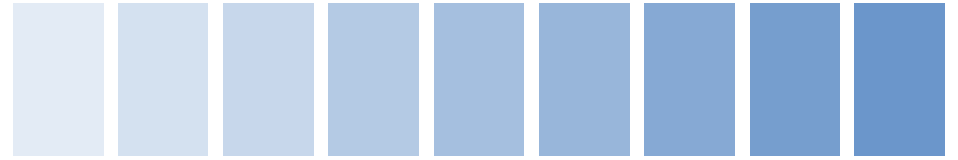
Alameda County Pilot Site



3-link, 6-signal, 0.9-mile segment; sensors at **A,B,C,D**

Intersection D





Travel Time Competitive Solutions

- **Toll tags**
 - Valid solution only in regions where they already have tags
 - Need sufficient penetration
 - Privacy issues
- **Video (LPR)**
 - Inaccurate due to vibrations, weather, regular calibration required
 - Privacy issues
- **GPS based systems**
 - Technical feasibility unproven/being demonstrated/evaluated on small scale
 - Will require large penetration (% of vehicles contributing data)
 - Privacy issues
- **Loop / Radar count stations**
 - Provides count and occupancy information
 - Currently work on freeways but not on city streets
- **There is no solution commercially available today that provides arterial travel times in an accurate and anonymous manner.**



Example application for OD Travel time from San Diego to Chula Vista on I-805

